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REPORT

OF

SPECIAL COMMITTEE

OF THE

MEDICO-LEGAL SOCIETY

UPON

SCHOOL HYGIENE.

NEW YORK:
TERWILLIGER & PECK, FINE PRINTERS AND STATIONERS
8 EIGHTH AVENUE

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PROCEEDINGS

OF THE

MEDICO-LEGAL SOCIETY,

APRIL 5, 1876.

Report of Committee to confer with the School Authorities, with a view to such Legislation as may promote the Health of School Children.

The undersigned, a committee appointed to confer with the school authorities, with a view to such legislation as may promote the health of school children, report progress. They have addressed to the President of the Board of Education a letter, of which the following is a copy.

To WILLIAM WOOD, ESQ., *President of the Board of Education, N. Y.*

DEAR SIR: The undersigned, having been appointed a committee under the resolution of the New York Medico-Legal Society, "to confer with the school authorities, with a view to such legislation as may promote the health of school children," beg leave respectfully to call your attention to some of the evils which seem to us to demand a remedy.

At the outset of our inquiries our attention has been arrested by a report of the committee on By-Laws, etc., of the Board of Education, under date of March 15, 1876, not yet adopted, and recommending a continuance, or at best only slight modifications of conditions which we are convinced are utterly inconsistent with due care for the preservation of the health of the children in the public schools.

We are gratified to observe in that report a full recognition of the unsanitary condition of the public schools generally, and the recognition of the power of the Board of Education to correct the evil, and this encourages us the more in submitting for your consideration the following suggestions.

We first notice the conclusion of your committee in regard to the amount of air-space required, and the causes of overcrowding. "In fixing the sitting capacity of rooms, the following shall be a minimum allowance of floor surface and air-space per pupil. In the three lower grades of primary schools and departments, five square feet and seventy cubic feet; in the three higher grades, six square feet and eighty cubic feet; in the four lower grades of grammar schools, seven square feet and ninety cubic feet; in the four higher grades, nine square feet and one hundred cubic feet." (Rep't, pp. 229-230.) "The Principals of schools zealous in their desire for a large number of pupils, and in their competition in this respect with neighboring schools, often also urged and harassed by the constant importunity of parents, have in many instances crowded their class-rooms, by admitting more pupils into them than their capacity would admit. This, of course, has been done by an exercise of their own authority, unlimited as it has been by any regulation, either of the Board of Education or of the Ward Trustees. (Rep't, pp. 227-228.)

Such a capacity of school-room space, though confessedly greater than that which now is and hitherto has been allowed thousands of children in the public schools of New York, is not, so far as we have been able to learn, consistent with physiological law, or with the opinions upon this subject of those whose scientific judgement is entitled to deference and respect. Without dwelling upon the universally acknowledged importance of a pure atmosphere as the first condition of health, we may be permitted briefly to rehearse certain facts as the basis of our recommendation.

The atmosphere chiefly consists of a mixture of two gases, oxygen and nitrogen, in the proportion of one volume of the former to four of the latter. Oxygen is also called *vital* air, because upon it depends vital existence; it is the first element of our bodily tissues, and, through respiration, affords fully three-quarters of our bodily nourishment throughout our lives, and is absolutely essential at every moment of our existence, to the healthy development and maintenance of our bodily organs; the other fourth of our nourishment we obtain in the shape of aliment, which also in part consists of oxygen. The nitrogen of the atmosphere is neutral, deemed to be merely diluent of the oxygen. There is besides, in the free atmosphere, a third gas, *carbonic-acid*, or *fixed-air*, in the proportion of four volumes per 10,000. It is the same as that which miners call *choke-damp*, found in deep mines, shafts and wells, and in brewers' vats, so often first discovered by its fatal effects. But in the open air no one ever suffers on account of it, or for the want of an abundant supply of oxygen, the natural diffusion of these gases, when unrestrained, being always sufficient to maintain their due proportion.

The amount of air inspired and expired by a healthy person at every breath, is from twenty to thirty cubic inches, half a cubic inch of which is absorbed. And this half cubic inch wholly consists of oxygen. As applied to the whole volume of the air breathed (oxygen being one-fifth only), every individual renders not less than five cubic feet of air unfit for respiration every hour, by the abstraction of oxygen alone; but besides this, the half cubic inch of oxygen taken up at every breath is replaced by a relative amount of carbonic acid given out, so that the air respired *once only* contains of carbonic acid *one hundred times as much* as it did when it was inspired, or $5\frac{1}{2}$ per cent. of its volume. Nor is this all. Besides the surcharge of carbonic acid, and the absorption of oxygen, the air of closely filled rooms is still further contaminated by the exhalation of watery vapor, additional carbonic acid exhaled from the skin, and dead organic matter exhaled from both the lungs and the skin in varying quantities, but usually so abundant in the close, hot and dry atmosphere of our city school-rooms, as to be offensively apparent at all times, and a fruitful source of disease.

In regard to the deleterious effects of an excess of carbonic acid alone in the air we breathe, there is no difference of opinion among competent authorities. All agree that when it reaches the proportion of 1 volume per 1,000, it is dangerous to health; if not immediately, none the less certainly in its cumulative effects. It creates a general indisposition of both body and mind, stunts bodily and mental development, and particularly predisposes to scrofula and consumption; and its excess in crowded apartments is usually an index of the pres-

ence of other deleterious agents due to the same cause.

But besides these, there are still other gases frightfully abundant in the school houses of New York, due to the emanations from latrines and privies. For example: Primary School No. 1, on Ludlow Street, one of the *newest* and best arranged and appointed, besides being over-crowded and unventilated, is tainted throughout the halls, and at times by way of the fan-lights over the doors in the class-rooms, with the odors arising from the latrines in the basement, which are emptied only "once or twice a week." The seating capacity of this building is given as 1,700; actual register, 1,440; attendance, 1,329; square feet in 12 rooms, 3,264; cubic feet in the several class-rooms varying from 33 to 41 for each child! and on the day of our visit, March 27th, 50 children were absent on account of illness.—Hotels and manufactories, established and conducted for private gain, are supplied with the necessary volume and flow of water to carry off promptly offensive and dangerous matters; and that the children in our public schools should be exposed to poisons generated by means of these foul and disgusting latrines, only to economize the water needed to keep well constructed water-closets in order, is simply inhuman, and ought to be at once amended.

The habit of wetting coal in bulk in the cellars, which is sometimes practiced, causes it to emit poisonous gases deleterious to health, and it should be forbidden.

In addition to other and necessary modes of ventilation, the windows and doors of school rooms should be left open a sufficient time after school hours to insure an entire renewal of the air in the rooms; otherwise, bad air is accumulated and retained in the building for the next day.

Lofty ceilings are regarded by some as a principal means of insuring a sufficient measure in cubic feet for each person. Unless ventilation is secured for the upper portion of a room, a lofty ceiling only makes that portion of space above the tops of the windows a receptacle for foul air which accumulates and remains to vitiate the stratum below.

Children who have been ill with contagious diseases are allowed to return to school too soon. Upon inquiry of teachers, we learn that it is not uncommon for children to return to school in *two or three weeks* after scarlet fever or measles, and that there is no surveillance whatever in this regard for the protection of the schools against contagious diseases.

Remedial measures are scarcely less apparent than the necessity for them. No cubic space, large or small, can be made to take the place of sound principles of construction, the necessary admission of fresh air, the escape of foul air, and a sufficiency of light falling at the proper angle upon both the book and the eye, or the necessity and benefits of intelligent sanitary supervision.

We would recommend that constant, thorough, scientific survey and sanitary inspection and supervision be permanently provided for. The nature of the questions, and the vital and paramount interests involved, ought to insure this measure without argument.

We have observed with pleasure that you have recommended that the minimum age of admission to the schools be raised to six years. We believe eight would be still better; but we regard confinement and labor in school, in constrained positions, and breathing bad air,

at the tender age of less than six years, as being destructive to both the physical and mental powers, and in every aspect of it, wholly inexcusable.

For the same reasons that we would recommend six years as the minimum age, we would make *three* hours the maximum daily attendance upon the primary departments and schools.

In fixing the "sitting capacity," it should be borne in mind that the smaller the allowance the greater the necessity for the constant admission and change of air. If an individual be confined in a room containing 1,000 cubic feet, in twenty-four hours such a room would contain one part of carbonic acid to every 100 parts of air, besides the amount given off by the skin, and would be deadly.

If the cubic space be small, the means for change of air must be large in the inverse ratio. Thus, with a space of 100 cubic feet, in order to maintain the air at a healthy standard it must be changed thirty times an hour, which is not practicable without exposing the inmates of the room to dangerous currents.

The minimum cubic space in which the standard of atmospheric purity may be maintained without perceptible draught has been found, by actual experiment with the most perfect mechanical appliances hitherto devised, to be 424. This amount of space will admit of renewal six times an hour without appreciable draught.

Taking this at the lowest standard, and accepting the concurring opinions of all credible authorities, that with *the best practical means of ventilation* the margin for contingencies should be, at the least, equal in area to the demonstrated actual necessities, and we have upwards of 800 cubic feet at the lowest standard of allowance for twenty-four hours.

We would therefore recommend an adaptation of this amount to school hours. Every individual actually poisons fifteen cubic feet of air every hour. To prevent this, thirty cubic feet, at the least, should be provided hourly, which proportion, for five hours daily school session, requires 150 cubic feet as the smallest space compatible with efficient ventilation without dangerous exposure to draughts.

The difficulties attending a radical reform in the sanitary management of the public schools is fully appreciated. The vast numbers to be provided for, the urgency of parents, the ambition of principals and teachers, the lack of sufficient room, the immense cost of new buildings, and the faulty structure of existing ones, have all been borne in mind.

But if all that is desirable cannot be accomplished now, at least a part may be; and the extreme importance of the subject has impressed us with the duty of stating facts and correct principles plainly and fully.

Relying upon this, and upon your own well known devotion to the public schools, as being at once our apology and our hope for your active co-operation,

We are, very respectfully, Your obedient servants,

GEO. H. YEAMAN, R. J. O'SULLIVAN, M. D.,
A. N. BELL, M. D., R. S. GUERNSEY,
D. S. RIDDLE.

New York, April 4th, 1876.

The report was adopted as the sense of the society, and the committee continued.

SECOND REPORT.

At a Meeting of the Medico-Legal Society held October 4th, 1876, Dr. R. J. O'Sullivan Read the Report as follows:

Your committee having in their first report discussed fully the sanitary defects of the public schools in this city in relation to the air-space required, etc., deem it unnecessary to rehearse the conclusions arrived at, as they have been published in full in the official organ of the society.* The committee will therefore content themselves on this occasion in stating the progress made, and making such further suggestions as in their judgement may tend to mitigate the evils to which school children are subject, and place the unsanitary condition of these schools clearly before the public.

The efforts of this Society to promote the health of school children have attracted considerable attention, and have elicited favorable comments from educators interested in the success of our schools and the health of the pupils. At the last meeting of the American Social Science Association, at Saratoga, reference was made in laudatory terms to this Society in the action taken on sanitary reform in schools. A member of the committee was invited to participate in the proceedings and open the discussion on diseases of the school-room. It is scarcely necessary to say that no more important subject has engaged its attention, as it concerns the well-being of society and the physical condition of the future citizens of this great metropolis. It is plain to the observer of passing events that society in our midst is in a state of transition, and that the physical condition enters largely into its causation. We see the evidence of this in various ways—notably, irritation of the brain and incidental diseases, nipping in the bud in the prime of life our most prosperous citizens, cutting them off from society, and lowering them into a premature grave.

This is no imaginary picture. Look around us in public assemblies and see in those scarcely entering middle life the evidence of physical decline, the prematurely bald and gray, the facial muscles photographing the wearied brain and over-taxed nervous system. It is stated by competent authority that "two hundred thousand persons are annually slaughtered in the States by preventable diseases."† What the percentage of school children may be we cannot say with any degree of accuracy, but it is fair to conclude that is is large. The forcing, cramming system in our schools and colleges gives no assuring indication of a change for the better in the generation that is to follow us. If we cannot expect a change in the condition of the adult population, let us by all means turn our attention to the little ones, and save the youth of the land from the dangers that threaten them, unless sanitary reform in the schools be instituted.

Among the most urgent requirements of the common schools of this city are inexpensive primary schools, with ample play-grounds, sufficient class-room and necessary air-space. The present plan of construction of school-houses is defective in many respects. There is too much ornamentation, and attention given to mere appearance—

*The Sanitarian, vol. IV, p. 210, et seq.

† Report of Dr. H. I. Bowditch at the International Medical Congress.

entailing enormous expense. The assembling room—only used for a short time during the opening, and for exhibitions—takes up too much space, to the great detriment of class-room accommodation, which is especially noticeable in primary departments, where there exists the greatest need of class-room. Owing to this cause the younger children are packed closely in the galleries, or consigned to the basement or ground class-rooms, which are generally excessively overcrowded, badly ventilated, and in other respects unfitted for class purposes.

The dangers to which pupils are exposed will be more readily understood when it is stated that these class-rooms are lighted from the yard, and are in close proximity to the water-closets, surrounded, in some instances, by huge tenement houses, and separated only by a few feet from the gallery or infant classes, which average seventy-five pupils—commonly two classes occupying this space—packed as closely as it is possible to do, there being but one intermission of twenty minutes, during the morning session, allowed these hapless little ones. It is no wonder that these schools should be a fruitful source of the propagation of contagious diseases.

These are the dark spots in our school system—the canker that is gnawing its vitality and undermining its strength. It is to eliminate this excrescence, to heal the corroding sore, and induce healthy granulation ; in a word, to rejuvenate this admirable but badly managed system of public education, viewed from a sanitary stand-point, that we strive for and labor earnestly, having an abiding faith that when the public understand the subject sufficiently the evils complained of will be corrected, and health in schools an established fact, and not the mere theory so frequently referred to, but never realized.

These remarks are made to elucidate a point having an important bearing on the subject we are now considering. It is hoped that a slight digression will be pardoned whilst a brief allusion is made to the compulsory education law now being enforced in this city. Upwards of four millions of dollars are asked by the Board of Education for school purposes for the ensuing year. Among the items the sum of $25,000 —incidental expenses—for the enforcement of this law, and $100,000 for a reformatory, to which children of the required age who do not attend school are liable to be committed. There can be no question, we apprehend, as to the necessity of this law, or its enforcement under proper hygienic conditions, which, no doubt, was the intention of the framers of the law.

During the past month several thousand children were refused admission to the schools, owing, as alleged, to insufficient school-room. This applies mainly to primary departments. It is to these departments and schools that these children are compelled to go, according to this law, regardless of sanitary requirement or class-room accommodation, or failing to do so must go to prison. The injustice of enforcing this law under these conditions, must be plain to any one possessed of common sense. Indeed, it may be doubted if the higher courts of justice would willingly enforce a penal law at the risk of the health or the lives of those who cannot obey because room is not provided for them.

It is obvious that it is the duty of the State, or School Boards acting under its authority, when it offers the advantage of a common school education to those within its jurisdiction, to provide school-house with

ample accommodation and sufficient floor and air space, and to conserve in every reasonable way, the health of the pupils. If, on the contrary, the schools are in a condition detrimental to health (as can easily be proved to be the case in the schools of this city), school boards are derelict in their duty, and fail to comply with one of the most important requirements of their office. School-houses where young children are herded and forced to sit for hours in a vitiated atmosphere, in constrained positions, do not come up to the standard. It would be cruelty to animals—not to speak of tender little ones—to add to this torture by increase of numbers without increased accommodation. The idea of compulsory attendance under these circumstances is preposterous, and at variance with all wise and beneficent law, and the common rights of humanity. We do not desire to be understood as disparaging in any way the present Board of Education, as they are only complying with the requirements of the law. We have no doubt, from the excellent disposition they have lately manifested, in reducing the attendance in the more crowded departments, that they will give further attention to this matter, by the adoption of such measures to improve the sanitary condition of schools as are within their jurisdiction and means.

We would respectfully suggest short sessions in the lower grades of primary departments and schools, as a measure which would be beneficial to pupils; as in returning to school after the noon session in stormy weather they are exposed to catarrhal affections, which are of frequent occurrence in this variable climate, especially during the fall and winter months. As to the feasibility of this proceeding, as to whether it would interfere materially with class exercises and the results expected of teachers as determined by their annual examinations, we have asked the opinion of some of the most experienced teachers, and have invariably had their opinion, both verbally and in writing, that one session a day would be ample, and would not prevent the best results of school work. We are aware that the State law requires two sessions; but the Board of Education possesses a discretionary power in this matter. For instance, it has lately given orders to the schools to dismiss on rainy days at two o'clock, whereas the afternoon session is not concluded until three o'clock, or about that time. Now if the School Board has power to make this regulation, it certainly has the power of dismissing at any time after entering the second session, say from ten to twenty minutes after its commencement.

In answer to an inquiry, Dr. O'Sullivan received a note from one of the most respected principals, a gentleman of very large experience; who has for more than thirty years occupied that position. He says:

"The sanitary condition of our public schools, a subject to which you have devoted much of your thought and time, is now engrossing a large share of public attention. A movement has undoubtedly been made in the right direction by limiting the number of pupils to the area of class-room accommodations. Still, many of our school buildings, especially the primary departments thereof will be found far from wholesome. I remember that years ago you were an advocate for shorter sessions for our primary schools. It seems to me that were your ideas on that subject made practical they would go far toward clearing up the difficulties which surround the subject.

"Of course we shall not stand where we should on this important

matter until the arrival of that, I fear, far off millennial day, when wise architects and intelligent school officers shall fully appreciate the fact that there are in existence such agencies as carbonic acid gas and oxygen; and that to provide an adequate supply of the one, and to get rid as speedily as possible of the other, is more important than fine architectural effects or elaborate furniture.

"But to return to your idea of shorter sessions. If the children in what are called the gallery classes of our primary schools, whose average age does not exceed six years, could be dismissed at one instead of three (with suitable intermissions during the session), two desirable results would ensue. First, the little children would be released from long and exhausting confinement in a vitiated atmosphere; and second, the room space occupied by them could be utilized for the better accommodation of the older pupils, who remain until three o'clock.

"I would go further, for I believe that more good solid school work can be done in all the departments in one session of four hours than is now done in six. The children return to school in the afternoon after partaking of a hearty dinner (which, I think, you will concede is not conducive to increased mental effort), often fatigued by play, and during the warm months overheated, so that the afternoon session is a tax on the vitality of both teachers and scholars, without any corresponding mental benefit.

"If, however, you and your coadjutors can obtain a respite for the little ones, who, I verily believe, are being poisoned by foul air and buried under 'ologies,' you will have done a good work, for which the survivors will bless you."

The necessity of medical inspection of schools alluded to in our first report has lately been discussed in several medical and other scientific associations. The recommendation made in that report viz., that sanitary inspection be permanently provided for, was fully concurred in. At the meeting of the Medical Society of the State of New York, June 20th, 1876, the President, Dr. Thomas F. Rochester, in his inaugural address remarked that "Education was not in all instances the unmistakable blessing which it seemed to be, for it became necessary to acquire it at too great risks." He recommended that every school district should have a competent and well-paid medical director, who should devote himself thoroughly and conscientiously to the many hygienic duties of the position. It would not involve an increased expense. On the contrary, it would be to the community a most economical procedure. "The Society, as representing the profession of the State, should take such action as would inaugurate and perpetuate a reform in this respect."

At the meeting of the American Social Science Association at Detroit, 1875, (also at its recent meeting at Saratoga) the subject was thoroughly discussed. A project of a law establishing the office of medical inspector of schools was presented. An abstract of this law, with slight modifications, is presented for your consideration:

First. He shall be appointed by the Board of Education.

Second. Term of office three years.

Third. Must be a physician.

Fourth. Salary.

Fifth. He shall take cognizance of the interests of health among the teachers and children of the public schools.

Sixth. He shall make sanitary investigations in respect to school houses and grounds, and to all circumstances connected with the management and instruction of schools, which may appear to influence the health of scholars or teachers.

Seventh. He shall make himself acquainted with the means employed in other States for preserving the health of the inmates of schools.

Eighth. He shall seek to trace the origin and mode of extension of epidemic or other diseases among inmates of schools, and to point out measures for the arrest or prevention of such diseases.

Ninth. He shall from time to time inform the Board of Education of the results of the aforesaid investigations, and shall suggest to the said Board such modifications of the sanitary management existing in the schools of this State as, in his opinion, would conduce to the health of the teachers and scholars.

Tenth. He shall further, in the month of January of every year, present to the Board of Education a written report of his doings and investigations in the line of his duty as aforesaid for the year ending with the 31st of December next preceding.

Eleventh. He shall gather, and from time to time shall present to the department, such information in respect to the interests of the public schools as he may deem proper for diffusion among the people.

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APPENDIX.

As compulsory measures in school legislation have recently been inaugurated a brief inquiry as to the effect seems necessary. Compulsory education has been already discussed. A word as to compulsory Vaccination. There has been in former years among a certain portion of the population of this City much opposition to vaccination; though, now happily decreasing. This was especially noticeable in the eastern portion and among the Germans. The item we are about to mention, speaks well for the intelligence of the latter. During the epidemic of 1871, the Medical Officer of the Board of Education supervised the vaccinations of upwards of 40,000 children, no child being vaccinated without the consent of its parents, which gave very general satisfaction, and every one escaped contagion. In attempting this work on previous occasions the Board of Health met with a good deal of opposition, and had but partial success. Some time since the Board made a further attempt, and after a year's trial reported to the Board of Education that they did not succeed in vaccinating over ten per cent. of the pupils, and asked that compulsory vaccination in schools be enforced, which request was acceded to. It must be admitted that under certain circumstances compulsory vaccination in schools might be necessary, as in the midst of an epidemic; but as has been demonstrated, if this protection can be given without compulsion, and with the approval of parents the latter course is preferable, and School Boards should give it a fair trial with the means at their command before having recourse to compulsory measures.

We subjoin the following abstract on diseases of the eye in schools, which is taken from the transactions of the American Social Science Association at their meeting at Detroit, 1875. These statistics are valuable, as indicating that near-sightedness and other forms of eye diseases are rapidly increasing in schools, and show the necessity of constant and competent supervision. In Cincinnati, O., 1,264 eyes of scholars were examined. About one-third of these belonged to the district schools, one-third to the intermediate and the remaining third to the normal and high schools—In the district schools, 13.3 per cent. were near-sighted (11.3 of the boys, and 15.3 of the girls). In the intermediate schools, 13.8 per cent. were near-sighted (9.5 per cent. of the boys, 18.1 per cent. of the girls). In the normal and high schools 22.8 per cent. were near-sighted (22.2 per cent. of the boys, and 23.2 per cent. of the girls)

In the College of the City of New York, the examination showed the following results: 670 belonging to the introductory class, 210 to the Freshmen, 110 to the Sophomores, and 30 to the Juniors. In the introductory class, which is entirely made up of students who have recently passed the public schools. 21.9 per cent. were near-sighted; of the eyes of the Freshmen, 26.2 per cent. were near-sighted; of the Sophomores, 22.7 per cent. were near-sighted: of the Juniors examined, 50 per cent. were near-sighted. The number of Juniors examined was too small, however, to be of any scientific value.

The table shows that *staphyloma posticum*, one of the gravest organic changes in progressive near-sightedness, increased from 0.5 per cent. in the district schools, to 7.6 per cent. in the intermediate, and 10.4 per cent. in the normal and high schools.*

At the recent meeting of the International Medical Congress, at Philadelphia, a report was made on "What is the best mode of determining the hearing of school children?" It was stated that the need of some provision in our public school system for the better instruction of partially deaf children is shown by the fact that the number of cases of impairment of hearing in school children is much larger than is generally supposed. It was recommended that a competent examination be made by a Medical Inspector of public schools; the creation of such an office, and its importance in relation to this subject as well as to school Hygiene being strongly urged.

*It is understood that this report is as yet incomplete. Several eminent physicians are engaged in the work under the direction of Prof. C. R. Agnew, of this city.

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